# Ground Hornbills, the genus *Bucorvus*

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**Résumé**: Les deux espèces du genre *Bucorvus,* chacune occupant les savanes d'un côté différent de l'équateur avec très peu de chevauchement dans leur distribution, sont décrites et comparées. Contrairement à la plupart des calaos, ces grands oiseaux terrestres sont principalement carnivores et les femelles ne muent pas toutes leurs plumes simultanément pendant l'incubation.

The two species of ground hornbill, one on each side of the equator in the savannas of sub-Sahara Africa, are the largest hornbills and in many ways the most primitive. Hornbills form a distinctive Old World group of some 54 species, easily recognised by their long bills often surmounted by a high casque, and renowned for their habit of sealing the nest entrance to enclose the female during breeding.

## Evolution

Recent hybridisation studies of avian DNA by Charles Sibley and Jon Ahlquist suggest that hornbills are distinct enough to warrant their own order, the Bucerotiformes, closely allied to another African radiation which includes the hoopoes, woodhoopoes and scimitarbills.

Ground hornbills represent the earliest offshoot within the order, sufficiently distinct and probably early enough in the history of hornbills to warrant their own family, the Bucorvidae. Fossil remains assigned to this family are known from mid-Miocene deposits in Morocco. They are large birds, around 4kg in weight, with all-black plumage, except for white primaries which suddenly become exposed in flight. They lead a mainly terrestrial existence, hence their name, and are separable from true hornbills by such features as 15 rather than 14 neck vertebrae, elongated tarsi, a special tendon between pelvis and femur, and not sealing the entrance to their nest cavity. They are also unique among birds in having no carotid arteries, these being evident only as fibrous cords and their function assumed by other non-homologous blood vessels.

Interestingly, they share with other large hornbills in the arboreal Asian genus *Buceros* an especially well-feathered tuft on the preen gland, and both genera are unique in hosting feather lice of the genus *Bucorvellus.* Together, these strands of evidence suggest that ground hornbills are descended from forest-dwelling ancestors, evolving from tree-living frugivores into savanna-walking carnivores in much the same transition as that proposed for Man himself.

Ground hornbills are the only predominantly carnivorous hornbills and are among the few hornbills that walk rather than hop along the ground, with a long stride enhanced by the long legs and walking on the tips of the toes.

## Breeding

Ground hornbills breed in rock and tree cavities, neither sealing the nest nor showing specific nest sanitation behaviour, but with the female being fed at the nest like other hornbills while incubating and brooding. They prefer to line the nest with dry leaves, delivered to the female on the nest by the male, and at the start of the summer rainy season they lay one or two large white eggs, about 70 x 50 mm, with the pitted and nodulated shell typical of most hornbill species. Incubation proceeds for some 40 days and food is carried to the nest in a unique fashion among hornbills, as a bundle of several items held in the bill tip. In common with some other large true hornbills, the female does not moult her flight feathers simultaneously while breeding, the chick's skin turns from pink to black a few days after hatching and the chick is left alone in the nest from about a third to half way through the three-month nestling period. Again in common with other large hornbills, when both chicks hatch the younger sibling usually dies of starvation within a few days, being unable to compete against its older sibling.

## Identification

The two species of ground hornbill differ in a number of ways. The form of the casque, colour of the bill, eye and extensive areas of bare skin around the eyes and on the inflatable throat and foreneck, and their social organisation all differ. The facial colours are known to serve for sex, age, and probably species, recognition and the non-breeding ranges of the two species overlap over only a small area in Kenya and Uganda. Both species tend to be territorial, proclaiming their large ranges of 100-260 km$^2$ with deep booming calls, uttered daily in the still of dawn.

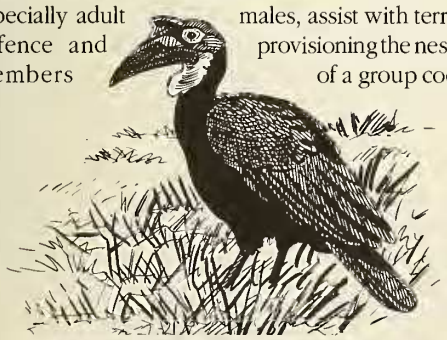
In the Abyssinian or Northern Ground Hornbill *Bucorvus abyssinicus,* the bill is black with a triangular patch of orange at the base of the upper mandible, probably coloured cosmetically with preen oils as in their Asian relatives. The casque arises at the base of the

bill in a short, high, cowl-like curve, with two ridges along each side, ending abruptly with an open anterior cavity. In adult males, the circumorbital skin is blue and the throat and foreneck red, with only a small blue area under the throat, but in the smaller adult female the face, throat and neck are entirely dark blue. Juveniles resemble adults but for their browner plumage, small irregular black spots on the white primaries, greyer bill with only a small pale yellow spot at the base and the casque only a slightly raised area on the base of the upper mandible. The facial skin starts out pale grey, develops recognisable but paler adult facial skin colours within a year of fledging and by two years old the casque is also well developed. Only adults utter the series of deep booming notes, 'uu-h uh-uh' or 'uu-h uh-uh-uh'.

In the Southern Ground Hornbill *Bucorvus leadbeateri,* the bill is all black, the casque only a low ridge at the base, and the eyes yellow not brown. In adult males the bare facial skin is all red, but in adult females there is a patch of violet-blue on the throat, sometimes extending down the sides of neck and as small spots onto the facial skin. Juveniles start out with grey-brown eyes and facial skin, only beginning to assume adult colours by their third year and are often not fully adult until they are between four and six years old, with possible individual and sexual variation. The main call is audible up to 5 km and accompanied by three body contractions, the last of which produces the double note. The notes are more distinct and the pitch slightly higher than its congener.

## Species biology

The species also differ in several aspects of their basic biology, despite such similarity in size and form. The Southern Ground Hornbill is the largest avian species known to be an obligate cooperative breeder, and one of only four African hornbills thought to exhibit this social organisation. They live in groups of between two and eleven individuals, within which only one pair occupies the alpha breeding position and all others, especially adult males, assist with territory defence and provisioning the nest. All members of a group coordinate their activities and remain close together throughout the day, social organisation being maintained by allopreening and group sunbathing, complex interactions involving giving and withholding food, play and group mobbing of predators, such as lion and leopard.



Abyssinian Ground Hornbill *Bucorvus abyssinicus*
by S. Mark Andrews

The Abyssinian Ground Hornbill, by contrast, is usually found as pairs of adults, or as trios or quartets with young birds. They normally breed as pairs, with no record of cooperative breeding, although occasional sightings of larger groups, including juveniles or an adult male with two females, suggest that it may sometimes occur facultatively.

Both species feed on any small animals they can overpower, including snakes, tortoises, lizards, *Acatina* snails, amphibians, hares, squirrels and quail, but with arthropods such as spiders, grasshoppers, beetles and caterpillars predominating in the diet. They also eat carrion and some fruits and seeds, including groundnuts, especially the more omnivorous Abyssinian Ground Hornbill with its longer, more slender bill and neck. The latter species also appears to forage differently, with more reaching for agile prey and less digging, and it also ranges into much drier steppe habitats than its southern counterpart.

## Relationships with man

Both species are revered by numerous indigenous tribes, as befits one of the most conspicuous avian predators of the African savanna. In more practical associations, stuffed hornbill heads are worn as disguise by Sudanese, Cameroonian and Hausa hunters when stalking game, strapped to their heads on a long wooden neck as they crouch to imitate ground hornbills walking through savanna, and Nguni tribes in southern Africa occasionally kill hornbills for use in ceremonies aimed at relieving drought. Unfortunately, both species decline where there are dense human populations and habitat destruction, are persecuted in developed areas where their aggressive territoriality leads to attacks on and shattering of their reflection in window panes, and are subjected to inadvertent poisoning during campaigns against livestock predators and carriers of rabies. Their slow breeding rate, groups fledging one chick every nine years on average in South Africa, their delayed maturity and low adult mortality, around two per cent per annum, make them vulnerable to persecution and slow to recover its effects. Fortunately, if protected, they can still exist alongside a wide range of agricultural practices which suggests a long future for these special members of the African avifauna.

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